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EDITORIAL

FCAA RELATED NEWS, EVENTS AND BOOKS (FCAA–VOLUME 17–3–2014)

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Dear readers,

in the Editorial Notes we announce some important news for our journal, information on international meetings, events, new books, etc. related to the FCAA (Fractional Calculus and Applied Analysis) areas.

1. Forty Years of the First Two Books on Fractional Calculus

Remember the ***first book*** entirely devoted to the topic of Fractional Calculus!

K.B. Oldham, J. Spanier, ***Fractional Calculus: Theory and Applications, Differentiation and Integration to Arbitrary Order***. Academic Press, Inc., New York-London, 1974, 234 pp., ISBN: 0125255500.

See details at:
http://www.springer.com/mathematics/book/978-3-540-07161-7.

New edition: Dover Publications, Inc., 2006; 234 pp., ISBN: 0486450015, 9780486450018.

Book's Description: The product of a collaboration between a mathematician and a chemist, this text is geared toward advanced undergraduates and graduate students. Not only does it explain the theory underlying the properties of the generalized operator, but it also illustrates the wide variety of fields to which these ideas may be applied. Rather than an exhaustive treatment, it represents an introduction that will appeal to a broad spectrum of students. Accordingly, the mathematics is kept as simple as possible. The first of the two-part treatment deals principally with the general properties of differintegral operators. The second half is mainly oriented toward the applications of these properties to mathematical and other problems. Topics include integer order, simple and complex functions, semiderivatives and semi-integrals, and transcendental functions. The text concludes with overviews of applications in the classical calculus and diffusion problems.

pp. 579–584 , DOI: 10.2478/s13540-014-0186-0

Springer

Remember the ***first international conference*** entirely devoted to the topic of Fractional Calculus!

B. Ross (Ed.), ***Fractional Calculus and Its Applications (Proc. of the Internat. Conf. held at the University of New Haven, June 1974)***. Series: Lecture Notes in Mathematics, Vol. **457**, Springer, Berlin-Heidelberg-N. York, 1975, 386 pp., ISBN: 978-3-540-07161-7.

See details at:
http://www.springer.com/mathematics/book/978-3-540-07161-7.

Table of Contents: A brief history and exposition of the fundamental theory of fractional calculus. – The use in mathematical physics of Erdeélyi-Kober operators and of some of their generalizations. – The Weyl fractional calculus. – H-R transform in two dimensions and some of its applications to partial differential equations. – Inequalities via fractional integration. – An access to fractional differentiation via fractional difference quotients. – A family of integral representations for the solution of the diffusion equation. – Fractional integrals of generalized functions. – The fractional derivative and entire functions. – Formulas of the Dirichlet-Mehler type. – A child's garden of special functions. – An algebraic definition of fractional differentiation. – Generalized Poisson integrals and regularity of functions. – Fractional spaces of temperate distribution. – Applications of fractional calculus to spherical (radial) probability models and generalizations. – A problem of hyperstereology. – A hypergeometric integral equation. – Application of fractional differentiation to the modeling of hodograph linearities. – Fractional calculus in the operator field of generalized functions. – A functional relation. – On moments of probability distribution functions. – Fractional integration of fundamental solutions. – Fundamental properties of fractional derivatives via Pochhammer integrals. – On the recent trends in the development, theory and applications of fractional calculus. – Open questions for research.

2. Calendar of Events Related to FC (Future and Past)

8th International Workshop AMADE-2015 (Analytic Methods of Analysis and Differential Equations) 14-19 September 2015, Minsk, Belarus

The programme of the Workshop will include series of lectures of leading researchers in different areas of Analysis and Differential Equations and short reports of young mathematicians. We suppose to devote it to

the memory our colleague and friend Anatoly Kilbas (the slogan of the Workshop will be "5 years without Anatoly").

For details and further information, please contact Sergei Rogosin at e-mail: rogosinsv@gmail.com.

Memorial Scientific Conference
"Hereditary Mechanics of Deformation and Fracture of Solids – Scientific Heritage of Yu. N. Rabotnov"
24-26 February 2014, Moscow, Russia

This conference was held in the Research Institute for Machine Science named after A.A. Blagonravov of the Russian Academy of Sciences (IMASH RAN). It was dedicated to the 100-year anniversary of the Russian Academician Yury Nikolaevich Rabotnov, who was outstanding researcher in the field of Mechanics of Solids. In IMASH RAN, he headed the research laboratory of fracture mechanics from 1965 till 1985.

The papers presented at the conference reflect the development of those fundamental trends in Mechanics of Deformable Solids, which were originated and developed by Yu.N. Rabotnov and wherein he contributed a lot.

Among them are: hereditary theory of viscoelasticity, algebra of fractional exponential operators, mechanics of diffuse fracture, theory of shells, theory of plasticity, mechanics of composites, theory of stability, and so on.

Fifty seven lectures of his disciples and progeny presented during the conference have shown the further development of theoretical and applied research in these fields of Mechanics, which are the strong background of advanced technologies in mechanical engineering and machine science allowing one to create new machinery.

In this issue of the *FCAA* journal we publish a historical survey by Yu.A. Rossikhin and M.V. Shitikova dedicated to this centennial jubilee, presenting a contemporary handling of Rabotnov operators introduced in 1948 and showing their connectedness with fractional derivatives, what provides the ageless interest to his ideas and results.

Also, we reproduce here the original Rabotnov's paper of 1948, with the kind permission of Editorial Board of the journal "*Prikladnaya Matematika i Mekhanika*", and translated in English by M.V. Shitikova.

3. New Books

T.M. Atanackovic, S. Pilipovic, B. Stankovic, D. Zorica, *Fractional Calculus with Applications in Mechanics: Vibrations and Diffusion Processes*. ISTE Ltd. - London, UK & J. Wiley and Sons - Hoboken, NJ 07030, USA; Jan. 2014, 336 pp., ISBN: 978-1-84821-417-0.

See details et:
http://eu.wiley.com/WileyCDA/WileyTitle/productCd-1848214170.html.

T.M. Atanackovic, S. Pilipovic, B. Stankovic, D. Zorica, *Fractional Calculus with Applications in Mechanics: Wave Propagation, Impact and Variational Principles* . ISTE Ltd. - London, UK & J. Wiley and Sons - Hoboken, NJ 07030, USA; Jan. 2014, 406 pp., ISBN: 978-1-84821-679-2.

See details et:
http://eu.wiley.com/WileyCDA/WileyTitle/productCd-1848216793.html.

Books Description:

These two books contain various applications of fractional calculus to the fields of classical mechanics. Namely, they study problems in fields such as viscoelasticity of fractional order, lateral vibrations of a rod of fractional order type, lateral vibrations of a rod positioned on fractional order viscoelastic foundations, diffusion-wave phenomena, heat conduction, wave propagation, forced oscillations of a body attached to a rod, impact and variational principles of a Hamiltonian type. The books will be useful for graduate students in mechanics and applied mathematics, as well as for researchers in these fields.

Contents of First Book:

Yong Zhou, ***Basic Theory of Fractional Differential Equations***. World Scientific, Aug. 2014, 304 pp; ISBN: 978-981-4579-89-6.

See details at:
http://www.worldscientific.com/worldscibooks/10.1142/9069

Book Description: This invaluable book is devoted to a rapidly developing area on the research of the qualitative theory of fractional differential equations. It is self-contained and unified in presentation, and provides readers the necessary background material required to go further into the subject and explore the rich research literature. The tools used include many classical and modern nonlinear analysis methods such as fixed point theory, measure of noncompactness method, topological degree method, the Picard operators technique, critical point theory and semigroups theory. Based on research work carried out by the author and other experts during the past four years, the contents are very new and comprehensive. It is useful to researchers and graduate students for research, seminars, and advanced graduate courses, in pure and applied mathematics, physics, mechanics, engineering, biology, and related disciplines.

Contents:
– Fractional Functional Differential Equations;
– Fractional Abstract Differential Equations;
– Fractional Evolution Equations;
– Fractional Boundary Value Problems;
– Fractional Schrödinger Equations;
– Fractional Euler-Lagrange Equations;
– Time-Fractional Diffusion Equations;
– Fractional Hamiltonian Systems;
– Existence and Uniqueness'
– Continuation;
– Mild Solutions;
– C_0-semigroup;
– Almost Sectorial Operators;
– Multiplicity;
– Variational Approach;
– Critical Point Theory.

Readership: Graduate students and researchers in the fields of fractional differential equations, fractional calculus and related areas of research.

Varsha Daftardar-Gejji (Ed.), ***Fractional Calculus: Theory and Applications***. Narosa Publ. House, Delhi-Chennai-Mumbai-Kolkata, 2014, 232 pp; ISBN: 978-81-8487-333-7.

See details at:
http://www.narosa.com/books_display.asp?catgcode=978-81-8487-333-7

Book Description: The fractional calculus (FC) deals with differentiation and integration of arbitrary order. The origin of this subject can be traced back to the end of seventeenth century, the time when Newton and Leibniz developed foundations of differential and integral calculus. Nonetheless, utility and applicability of FC to various branches of science and engineering have been realized only in last few decades. The recent years have witnessed tremendous upsurge in research activities related to the applications of FC in modeling of real-world systems. Unlike the derivatives of integral order, the non-local nature of fractional derivatives correctly models many natural phenomena containing long memory and give more accurate description than their integer counterparts. The present book comprises of contributions from academicians and leading researchers and gives a panoramic overview of various aspects of this subject: Introduction to Fractional Calculus Fractional Differential Equations Fractional Ordered Dynamical Systems Fractional Operators on Fractals Local Fractional Derivatives Fractional Control Systems Fractional Operators and Statistical Distributions Applications to Engineering.

Table of Contents: An Introduction to Fractional Calculus / Solving Nonlinear Fractional Differential Equations / Existence and Uniqueness Theorems: A New Approach / Chaos in Fractional Order Systems / Stability Analysis of Fractional Differential System with Delay / Controllability of Fractional Dynamical Systems / Matrix Variate Fractional Operators and Statistical Distributions / Local Fractional Calculus: A Review / Outline of Calculus on Fractals and Applications / Random Walk and Broad Distributions on Fractal Curves / Some Recent Results on Fractional Diffusions / Introduction to Linear Fractional-order Systems / Fractional-order Nordheim-Fuchs Model for Nuclear Reactor.

Audience: Postgraduate Students, Libraries, Researchers and Professionals.

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